REMARKS

Claim 1 has been amended to correct the misspellings noted by the examiner in his objection to the claim.

Support for the amendment to claim 3and new claim 30 is found at page 6 line 28.

New claim 29, finds support at page 7 lines 4 - 7 of the specification.

New claim 31 finds support at page 7 lines 4-7 and page 9 lines 19 - 25 of the specification.

New claim 32 is based on original claim 5.

Claims 1, 3, 6 and 7 have been rejected as being anticipated by Rodgers US Patent 5,648,041 and claims 1 and 3-7 stand rejected as being obvious over the same reference.

The present invention provides a method whereby molten fibers produced by a spinning apparatus are cooled and transformed into solid fibers in a way that keeps the fibers relatively straight while depositing them on a collection surface at a velocity that keeps the risk of breaking low. The first of these objectives is effected by contacting the fibers with a gas stream flowing at a higher velocity than the initial velocity of the fibers thereby maintaining a tension on the fibers as they pass through the venturi. The second objective is effected by reducing the velocity of the fibers after they pass through the venturi prior to their collection. This velocity reduction is effected by one or more of the geometry of the diffuser, the use of exhaust suction to create a "back-flow" in the lower level of the diffuser and control of the amount of gas exhausted from the diffuser through the collection surface. As noted in the paragraph commencing at page 9 line 19 of the specification, a combination of these features together with control of the amount of gas fed into the venturi can accomplish a reduction in the velocity of the fibers from 50m/sec at the exit from the spinning apparatus to 1m/sec when the fibers are deposited on the collecting surface.

Rodgers does not accomplish this. Rodgers teaches the use of a venturi and the supply of

additional gas thereto to try to keep fibers straight, but Rodgers does not address the problem of the need to slow down the fibers after they have been contacted with the high velocity gas stream in the venturi.

Claim 1 specifies the requirement that the diffuser should be such that velocity is reduced. Claim 3 specifies provision of exhausts positioned to provide upward on horizontal components to an exhaust gas stream thereby controlling the final velocity of the fiber. New claims 29 - 32 emphasize these velocity control features even more precisely. Nothing in Rodgers points to any of this. The examiner points to the top of column 3 of Rodgers. This, however is concerned only with making sure that the fibers do not become entangled and contains no suggestion of any of the means noted above and claimed in the present claims to control the velocity at which the fibers fall on to the collecting surface. It is noted that the only mention in Rodgers of an exhaust seems to be at column 6 lin 55 et seq, where the exhaust pulls fibers down on to the collecting surface, something that is useful to prevent entanglement, but of no help at all in slowing the velocity at which the fibers hit the collection surface. Nothing in Rodgers points to providing an exhaust that would draw gas in a horizontal or vertically upward direction as required by claims 3 and 30.

Furthermore nothing in Rodgers suggests that it is possible or desirable to reduce the velocity of the fibers to one fiftieth of their original velocity prior to reaching the collection surface as required by claims 5 and 32.

The inventor has made the following additional comments that may be helpful to the examiner in understanding that the present invention as claimed is novel and not obvious.

1- The performance of the diffuser and its design is to attain a desired velocity ratio. Inlet velocity is typically high and exit velocity is typically low. So, even though velocity ratio is a key factor, however, generating such a ratio and maintaining flow uniformity is the key challenge in this specific patent and design.

2- Due to the fragility of the (green) pitch fibers, formed in this process, very low and uniform velocities in the order of less than 5 feet per second is required. As the velocity increases the

force on the collected fibers, in the mat, increase and either crushes the fiber or results in fiber deformation. Such deformation, become permanent and possibly result in fiber kinks and cross sectional non-uniformities which then impact the fibers performance, if such features are introduced in fibers permanently. Therefore, precision of flow uniformity in the laydown region, the exit region of the diffuser, is the key for the success of this design. The gas removal design, incorporated in the exit region of the diffuser, allows for the flow uniformity to be accomplished and enables the reduction in flow speed mechanisms that are absolutely essential to high quality fiber production, using this design.

3- A spinning unit of this nature is typically used as a group of 5 to 10 diffusers, arranged inline (or slightly staggered) one next to the other to form a linear fiber production array. Fiber is produced in the form of a continuous mat, with a width of 60 to 90 inches wide. Fiber uniformity in the mat along and across the mat is one key and important feature of the design and successful operation of the process. Since individual spinning units and flow management diffusers are adjacent to each other, their sides are closed. This limits the exit area geometry to reduce the velocity uniformity, proportionately. Only as a result of the inventor's unique suction design, which is highly innovative and allows additional control features, incorporated in this invention, such uniformity and flow quality has been created to produce quality fibers successfully at high production rates.

4- Precision and detail control of the flow through the laydown screen determines the spinning and hence the fiber quality. The green fiber mat will have to be thermally processed in a number of ovens where hot gases are passed through the fiber mat to make carbon fibers. Again the fiber geometry and distribution uniformity in the mat determines the success or failure of the thermal processing which is reflected in the fiber properties.
The innovations and design features incorporated in this invention are new, unique, unconventional and therefore not obvious extension of the Rodgers et al. design. Even though there are certain geometrical similarities between the two designs, the detail nature of this design and that of Rodgers' are fundamentally different.

Nothing in the cited art would lead a person having ordinary skill in the art to add the control

features noted above which distinguishes the invention claimed from Rodgers. It is therefore submitted that the invention as claimed in Claim 1 and the claims dependent on it and especially claims 3, 4, 5 and 29 - 32 meet the requirements of 35 USC 103.

In view of the foregoing, it is submitted that this application is in order for allowance and an early action to this end is respectfully solicited.

Respectfully submitted,

JOHN RICHARDS
C/O LADAS & PARRY LLP
1040 AVENUE OF THE AMERICAS
NEW YORK, NEW YORK 10018
REG. NO. 31053
TEL. NO. (212) 708-1915